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| 10/623,833 | 07/21/2003 | Giuseppe Rotondo | GEN-901A (22177-0023) | 6523 |

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| EXAMINER | |
|---|---|
| SUCHECKI, KRYSTYNA | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2882 | |

DATE MAILED: 03/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

H·A

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/623,833 | ROTONDO ET AL. | |
| | Examiner | Art Unit | |
| | Krystyna Suchecki | 2882 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *16 January 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-18 and 20-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *23* is/are allowed.

6)☒ Claim(s) *1,4-18 and 20-22* is/are rejected.

7)☒ Claim(s) *2 and 3* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 20 and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Doebert (US 5,511,106).

3. Regarding claim 22, Doebert teaches a method for operating a dental x-ray diagnostic apparatus performing real- time digital radiography in Cephalography, comprising the steps of: aligning an x-ray source with an x-ray imager, either manually or automatically, wherein the step of aligning the x-ray source with an x-ray imager includes the step of relocating the x-ray imager from a Panoramic position to a Cephalographic position with a manual mechanism (Column 3, lines 22-47; Column 9, lines 22-64); positioning a patient by a patient positioning system (Column 3, lines 16-21); setting a collimator to provide a narrow x-ray beam laying in a horizontal plane (Figure 11); and starting a scanning process during which the x-ray beam is linearly translated through a patient skull in a vertical (V) direction by a coordinated vertical movement of the collimator and the x-ray imager under computer control, while the x-ray source is fixed in position (Column 6, lines 57-65); and, performing acquisition of image data by the x-ray imager, and computer processing (Column 9, lines 8-13) for reconstruction of a diagnostic image.

4. Regarding Claim 20, Doebert teaches a method for operating a dental x-ray diagnostic apparatus performing real- time digital radiography in Cephalography as above for claim 22 with the alternative step of starting a scanning process during which a vertical x-ray beam is linearly translated through a patient skull in a horizontal (Y) direction by a coordinated horizontal movement of a collimator set to provide a narrow beam laying in a vertical plane and an x-ray imager under computer control while the x-ray source is fixed in position (Figure 8).

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1, 4-10 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zeller in view of Mori (US 5,506,879).

7. Regarding claims 1, 4, 11 and 16, Zeller teaches a dental x-ray diagnostic apparatus for performing real-time digital radiography in Cephalography of a patient skull and method for operating a dental diagnostic apparatus performing same, comprising: a base frame arrangement (Figure 7); a rotary frame ("Rotary Unit") coupled to the base frame arrangement, the rotary frame supporting an x-ray source (3); a cinematic unit connecting the rotary frame and the base frame arrangement, the said-cinematic unit being configured to execute movements of the rotary frame (Column 5, lines 3-18) controlled by data supplied from a microcomputer (12); an x-ray imager (18,

18') disposed in a Cephalographic position, the x-ray imager being movable during a scanning operation by an independent actuator (9); and wherein the movements of the cinematic unit permit the rotary frame to permit illumination of the patient skull by the x-ray source. Zeller also teaches image acquisition of image data by the x-ray imager and digital processing of the image data for reconstruction of a diagnostic image (Column 4, lines 27-31; Column 7, lines 42-65).

8. Zeller does not teach a cinematic unit that executes roto-translational movements of the rotary frame, wherein the roto-translational movements comprise one rotation movement and two transverse linear movements in a horizontal plane, and the roto-translational movements of the rotary frame being driven by independent actuators in the cinematic unit and wherein the roto-translational movements of the cinematic unit permit the rotary frame to perform a roto-translating scanning trajectory to permit illumination of the patient skull by the x-ray source from a predefined virtual center of irradiation located at the focal point of the x-ray source. Zeller does not specifically teach an automatic computer controlled mechanism providing relocation of the x-ray imager selectively between a Cephalographic and a Panoramic position

9. Mori teaches Cephalographic imaging where a cinematic unit that executes roto-translational movements of the rotary frame, wherein the roto-translational movements comprise one rotation movement and two transverse linear movements in a horizontal plane, and the roto-translational movements of the rotary frame being driven by independent actuators (2a, 2c and 3a) in the cinematic unit. The actuators allow a supporting arm of the rotary frame to be aligned with respect to a Cephalographic plane

(Column 5, lines 54-67). The actuators also cooperate for roto-translational movements of the cinematic unit to permit the rotary frame to perform a roto-translating scanning trajectory to permit illumination of the patient skull by the x-ray source from a predefined virtual center of irradiation located at the focal point of the x-ray source (Figure 6 and Column 7). The actuators allow the parts of the machine to geometrically align to ensure the x-rays emitted from the source always irradiate to the receiver (Column 7). An automatic computer (12) controlled mechanism provides relocation of the x-ray imager selectively between a Cephalographic and a Panoramic position (Column 3, lines 19-23 and Column 5, lines 36-53) so that dental clinics can selectively photograph specific regions of a patient (Column 1, lines 12-23).

10. Therefor, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the three independent actuators of Mori in the method and apparatus of Zeller in order to allow a supporting arm of the rotary frame to be aligned with respect to a Cephalographic plane (Mori, Column 5, lines 54-67) and to permit the rotary frame to perform a roto-translating scanning trajectory to permit illumination of the patient skull by the x-ray source from a predefined virtual center of irradiation located at the focal point of the x-ray source so that the x-rays are always irradiated to the receiver (Mori, Figure 6 and Column 7). It would have been further obvious to provide an automatic computer controlled mechanism to provide relocation of the x-ray imager selectively between a Cephalographic and a Panoramic position (Mori, Column 3, lines 19-23) so that dental clinics can selectively photograph specific regions of a patient (Mori, Column 1, lines 12-23).

11. Regarding claim 5, Zeller teaches the apparatus as set forth in claim 1 wherein the x-ray imager is associated with a horizontal scanning movement (Figure 1, rotation arrow), and has a linearly shaped active area oriented vertically with a height substantially greater than a width (Figure 5).

12. Regarding claim 6, Figure 2 of Zeller teaches the apparatus as set forth in claim 1 wherein the x-ray imager (18') is associated with a horizontal scanning movement, and is linearly translated during a scanning movement by computer control of the independent actuator for the x-ray imager.

13. Regarding claim 7, Zeller teaches the apparatus as set forth in claim 1, wherein the x-ray imager (18') is associated with a vertical scanning movement (Column 3, lines 7-38), and has a linearly shaped active area oriented horizontally with a width substantially greater than a height (Figure 3).

14. Regarding claim 8, Zeller teaches the apparatus as set forth in claim 1, wherein th x-ray imager (18') is associated with a rotational scanning movement, and has a linearly shaped active area for use with a narrow x-ray beam. The intended use of the apparatus is not germane to the issue of patentability.

15. Regarding claim 9, Zeller teaches the apparatus as set forth in claim 1, wherein the x-ray imager (18') is associated with a vertical, or horizontal, or rotational scanning movement (Column 3, lines 7-38), and an x-ray beam is collimated by a collimator (15) intercepting the x-ray beam before a patient and in proximity of the patient, which is provided with an independent active actuator (14) capable of performing the linear or

rotational translation of the collimator during a scanning movement under computer control.

16. Regarding claim 10, Zeller teaches the apparatus as set forth in claim 1, comprising a collimator (10) operated by independent active actuators under microcomputer (29) control, allowing resizing of an x-ray field to any desired format required for a chosen radiographic modality as well as a translation of the x-ray field during a vertical or horizontal or rotational scanning process (Column 6, lines 38-45).

17. Claims 14 and 15, and are rejected under 35 U.S.C. 103(a) as being unpatentable over Zeller and Mori and further in view of Doebert (US 5,511,106).

18. Regarding Claims 14 and 15, Zeller and Mori teach a computer tomography apparatus and method as above for claims 1 and 11. A panoramic device is modified for a transverse scanning system (Column 2, line 55, corresponding to US 5,511,106) and contains a panel with first and second x-ray imagers (18, 18').

19. Zeller and Mori fail to expressly incorporate the Cephalographic features of the device such that the device has a mechanism providing relocation of said x-ray imager selectively between a Cephalographic and a Panoramic position wherein such mechanism comprises a detachable connector allowing in a secure and ergonomic way the manual connection and disconnection of the x-ray imager selectively between the Cephalographic and the Panoramic position. Zeller and Mori do not expressly incorporate the patient positioning system used in Cephalography as provided with independent active actuators by which a patient positioning system can be translated

relative to a corresponding support frame in order to maintain a firm patient position during a horizontal or vertical scanning process where a movement of the support frame is involved.

20. However, Doebert teaches a device that is selectable between a Cephalographic and the Panoramic position and that has a detachable mechanism to provide relocation of an x-ray imager panel allowing secure and ergonomic connection and disconnection of the x-ray imager selectively between the Cephalographic and the Panoramic position. The connection allows the panel to be lengthened or shortened dependent upon the type of exposure (Column 5, line 1-18). A micro processor (40) controls active actuators (drive motors D1, D3) to maintain a firm patient position during a horizontal or vertical scanning process where the movement of the same support frame is involved. The control assures that the patient skull position remains constant (Column 5, line 36-Column 6, line 8). The patient positioning system has parts (gears) that translate to effectively allow the patient to remain stationary while exposure and moving occurs (Column 3, lines 52-63). The advantages of including as many functions as is possible in to a single device is also taught in Doebert. By allowing functions such as Cephalography and panoramic exposures in a single device, the outlay of the device is minimized while increasing only the peripheral equipment for the device (Column 2, lines 12-38).

21. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a Cephalographic function in the panoramic and transversal device of Zeller and Mori, since the inclusion minimizes outlay (Doebert,

Column 2, lines 12-38). The inclusion of a detachable mechanism to allow transition between Cephalographic and panoramic positions would allow an x-ray imager to be lengthened or shortened dependent upon the type of exposure (Doebert, Column 5, line 1-18). Active actuators under control would assure that the patient skull position remains constant and translational parts associated with the patient positioning system would ensure the effective, firm, stationary position of the patient. (Doebert, Column 5, line 36-Column 6, line 8 and Column 3, lines 52-63).

22. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zeller, Mori and Doebert as applied to claims 11, 14 and 15 above, and further in view of Fairleigh (US 5,997176).

23. Regarding Claims 12 and 13, Zeller, Mori and Doebert teach an apparatus as above in claims 11, 14 and 15 as well as the use of a microcomputer (Zeller, 29) for control upon user command. An arm (Doebert, 6) can be used to provide relocation of parts.

24. Zeller, Mori and Doebert fail to teach a mechanism comprising a telescopic arm or a folding arm for providing relocation either manually or automatically by an independent actuator under microcomputer control upon user command.

25. Fairleigh teaches the automated movement of a telescopic or folding (Column 3, lines 3-7) arm by an independent actuator (hydraulic cylinders) to provide relocation of an imager selectively between Cephalographic and panoramic positions (Column 8, lines 42-56, Column 12, lines 26-37). The arm is used in a system with a processing

system (Column 13, line 55- Column 14, line 11). The folding arms provide a panoramic system with repeatability and a Cephalographic system with repeatability and versatile positioning (Column 2, lines 46-67 and Column 3, lines 23-36).

26. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the telescopic or folding arms controlled by an independent actuator under automatic control in the system of Zeller, Mori and Doebert for the purpose of providing a system with panoramic repeatability and a Cephalographic repeatability and versatile positioning (Fairleigh, Column 2, lines 46-67 and Column 3, lines 23-36). The automatic control of Fairleigh's arm could be achieved by the microprocessor of Zeller in order to allow a central location for control components.

27. Claims 18 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doebert (US 5,511,106) in view of Kopsala (US 6,731,717).

28. Regarding Claims 18 and 21, Doebert teaches a method for operating a dental x-ray diagnostic apparatus performing real- time digital radiography in Cephalography, comprising the steps of: aligning an x-ray source with an x-ray imager, either manually or automatically, wherein the step of aligning the x-ray source with an x-ray imager includes the step of relocating the x-ray imager from a Panoramic position to a Cephalographic position with a manual mechanism (Column 5, lines 1-18 and Column 9, lines 41-64); positioning a patient by a patient positioning system (Column 3, lines 16-21); setting a collimator to provide a narrow x-ray beam laying in a vertical plane

(Column 6, lines 28-56); starting a scanning process during which the x-ray beam is linearly translated through a patient skull in a horizontal (Y) direction by linear movement of the x-ray imager in the horizontal plane under computer control and performing acquisition of image data by the x-ray imager, and computer processing for reconstruction of a diagnostic image (Figures 8 and 9). The cephalograms are tomosynthetically produced (Column 8, lines 55-58) and Doebert provides for the correction of image distortions (Column 9, lines 8-13). Doebert teaches an alternative scanning process during which a collimator is set to provide a narrow horizontal x-ray beam that is translated through a patient skull in a vertical direction (Figure 11). Doebert also teaches the interchangeability of the vertical and horizontal arrangements (Column 8, lines 55-58).

29. Doebert does not start a scanning process during which the x-ray beam is linearly translated through a patient skull in a horizontal (Y) direction by a simultaneous and linear movement of the x-ray source and the x-ray imager in the horizontal direction, and performing acquisition of image data by the x-ray imager inclusive of correction of a magnification distortion in the horizontal direction. Doebert does not teach a scanning process during which a horizontal x-ray beam is linearly translated through a patient skull in a vertical direction by a coordinated vertical movement of the x-ray source and the x-ray imager.

30. Kopsala teaches Cephalography where a vertical x-ray beam is linearly translated through a patient skull in a horizontal (Y) direction by a simultaneous and linear movement of the x-ray source and the x-ray imager in the horizontal direction

(Figure 3), and performing acquisition of image data by the x-ray imager inclusive of correction of a magnification distortion in the horizontal direction (Column 1, lines 33-53). The simultaneous motion of the source and imager is what corrects for magnification errors, so that the acquired image data is corrected for magnification through mechanical means. The motions cause the system to utilize an appropriate focal spot and responds to changes in the magnification ratio during scanning (*Id.*)

31. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the simultaneous and linear movements and resultant magnification distortion correction of Kopsala in the system of Doebert, since the correction can account for variations of the magnification during the scan by utilizing the appropriate focal spot (Kopsala, Column 1, lines 33-53). It would have been further obvious to conduct a scanning process during which a horizontal x-ray beam is linearly translated through a patient skull in a vertical direction by a coordinated vertical movement of the x-ray source and the x-ray imager, as an alternative arrangement for Doebert (Column 8, lines 55-58), for the benefit of accounting for variations of the magnification during the scan by utilizing the appropriate focal spot (Kopsala, Column 1, lines 33-53). Doebert suggests the interchange the horizontal and vertical arrangements (Column 8, lines 55-58), a benefit for doing so being the ability to image an occlusion that is better viewed by a vertical scanning process than horizontal.

***Allowable Subject Matter***

Claim 23 is allowed.

Claims 2 and 3 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: claim 3 contains allowable subject matter for at least the reason that the prior art of record fails to teach or reasonably suggest a dental x-ray diagnostic apparatus for performing real-time digital radiography in Cephalography of a patient skull comprising a base frame, rotary frame, cinematic unit, first x-ray imager in a Cephalographic position and a second x-ray imager, the second x-ray imager being supported by the rotary frame and disposed opposite the x-ray source in a Panoramic position as claimed. Because of the expense of digital detectors and because of space constraints, the prior art teaches away from the inclusion of two costly digital detectors in two different places by moving the detectors from one position to another. This is true even in Doebert (US 5,511,106), who adds to an existing detector to expand its size (Column 5, lines 10-13) rather than provide two detectors in separate positions on the apparatus. While Kopsala (US 6,731,717) implies that two imagers are used (Figure 1), there is no express adjustment of imagers from a Panoramic to a Cephalographic position. The Panoramic imager may be moved out of the way, but the Cephalographic imager appears to remain set in position for its type of imaging. Claim 2 contains allowable subject matter at least by virtue of dependency.

Claim 23 contains allowable subject matter for at least the reason that the prior art of record fails to teach or reasonably suggest a method for operating a dental x-ray

diagnostic apparatus performing real- time digital radiography in Cephalography, comprising the steps of: aligning an x-ray source with an x-ray imager, either manually or automatically; positioning a patient by a patient positioning system; setting a collimator to provide a narrow x-ray beam; starting a scanning process during which the x-ray beam is rotationally translated about a horizontal axis through a patient skull by a coordinated movement of the collimator and the x-ray imager under computer control, while the x-ray source is fixed in position; and performing acquisition of image data by the x-ray imager, and computer processing for reconstruction of a diagnostic image as claimed. While a rotational collimator that can coordinate with imager motion is known (see Zeller, Column 6, lines 38-45), the collimator does not cooperate with a stationary source as claimed.

***Response to Arguments***

Applicant's arguments, see Response, filed 01/16/06, with respect to the rejection(s) of claim(s) 1-10 and 16 under at least Zeller have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Zeller, Mori and others, as above.

Applicant's arguments filed 01/16/06, with respect to the rejection of claims 18 and 20-22 in view of at least Doebert have been fully considered but they are not persuasive. Applicant desires more express disclosure of imager relocation. Attention is drawn to at least Figure 5, which shows a pluggable and un-pluggable detector. Mechanisms for removing a detector are readily observed. Doebert also expressly

recognizes a need in the art for relocation of imagers (Column 1), and provides an economical way to achieve two types of exposure using one imager (Column 5). The express teaching of Column 9, as set forth above, cannot be ignored for understanding the intention of Doebert to provide both Panoramic and Cephalographic imaging in one device. [With respect to Column 9, please recall the definition of a "skull exposure" as Doebert has used it to encompass Cephalographic exposures.] Other features argued, such as the simultaneous and linear motions, have addressed in the rejections set forth above.

Applicant's arguments, with respect to claim 23 have been fully considered and are persuasive. The rejection has been withdrawn.

***Conclusion***

Applicant is requested to at least consider using a type-face that reproduces more cleanly during the scanning and faxing processes.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Krystyna Suchecki whose telephone number is (571) 272-2495. The examiner can normally be reached on M-F, 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ks

EDWARD J. GLICK
SUPERVISORY PATENT EXAMINER